International Social Research Nexus (ISRN)
ISSN (Online): 3105-0069

Review Article

Pollution-Induced Physical Health Burdens: A Systematic Review of Global, South Asian and Bangladeshi Evidence

Nusrut Sharmin*

Department of Geography and Environmental Studies, University of Chittagong, Chittagong-4331, Bangladesh.

***Correspondence**
Nusrut Sharmin
Email: nusrutsharmin@gmail.com

Article History
Received: June 29, 2025
Accepted: October 23, 2025
Published: November 1, 2025

Citation
Sharmin, N. (2025). Pollution-Induced Physical Health Burdens: A Systematic Review of Global, South Asian and Bangladeshi Evidence. *International Social Research Nexus (ISRN)*, 1(3), 1-14.
https://doi.org/10.63539/isrn.2025026

Copyright
© 2025 The Author (s). Published by Scholar Cave. This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International License.

Open Access

Abstract

This study presents a systematic review of published research articles based on pollution outcomes on physical health at a global, South Asian, and Bangladesh level between the years 2000 and 2024. The review employed the PRISMA 2020 framework to identify and evaluate peer-reviewed articles and credible reports which consider the health effects of exposure to air, water, soil, noise, and occupational pollution. Seventy studies were eventually incorporated by using explicit inclusion and exclusion criteria. The findings reveal air pollution as the highest contributor to a broad variety of non-communicable diseases such as cardiovascular disease, stroke, chronic obstructive pulmonary disease (COPD), and cancer. Communicable diseases such as diarrhea, typhoid, and hepatitis are strongly related to water pollution in low-income countries. Although pollution impacts are being addressed in high-income countries by establishing regulations, countries in South Asia, particularly in Bangladesh, are continuing to experience increased health challenges ascribable to poor governance, poor infrastructure, and industrial activity. The review also identifies critical research gaps, such as a lack of longitudinal and rural area-focused studies in Bangladesh. These findings emphasize the significance of integrated pollution control policy, population health strategy and collaboration among regions to reduce pollution-related morbidity and mortality rates. The review enhances the broader understanding of environmental health disparities and provides a basis for policy and research on reducing environmental risks.

Keywords

Pollution, Physical Health Diseases, Environmental Health, South Asia, Bangladesh.

1. Introduction

Environmental pollution has become a major global health issue that claims about nine million deaths a year; affecting one in every six people worldwide (Fuller et al., 2022; Clark et al., 2024). Environmental risk factors (air, water, soil, and occupation-related exposures to pollution) are considered the most likely cause of various physical health diseases, such as cardiovascular, respiratory, cancerous illnesses, or neurodevelopmental disorders (Landrigan et al., 2018; Prüss-Ustün et al., 2016). In 2015 alone, the prevalence of fine particulate matter (PM 2.5) air pollution led to more than 4.2 million deaths and 103 million disability-adjusted life years (DALYs), which classifies it as being a major cause of morbidity and mortality globally (Cohen et al., 2017; Ruan et al., 2023). Although there have been some improvements in high-income contexts, the overall burden has been continuously high. Data indicate that low and middle incom

-e countries contribute a disproportionate burden because of higher levels of pollution as well as less stringent environmental policies (Clark et al., 2024; Moradi et al., 2023).

South Asia is a well-known example of this disproportion, with a share of deaths around the globe related to ambient PM 2.5 pollution, approaching 60 percent (Babatola, 2018; Cohen et al., 2017). Rapid industrialization, high population density, urban cities, and poverty are major reason behind this situation (Hasan et al., 2019; Noor et al., 2023; Irfan 2024). There are also massive soil and water pollution and high occupational health risks, which increases the danger of diseases caused by pollution (Noor et al., 2023; Liu et al., 2024). In Bangladesh, specifically, environmental health concerns are among the worst in the world. They encompass intolerable air pollution in urban hubs such as Dhaka, arsenic-contaminated groundwater, threatening millions of users, and toxic effluents of industrial enterprises that contaminate surface waters (Raessler, 2018; Islam & Mostafa, 2020). These overlapping exposures have led to high morbidity and mortality rates especially among the vulnerable groups.

Nevertheless, there is a noticeable gap in knowledge even though ample research has been conducted concerning the health-related risks associated with pollution. The majority of the currently available literature only addresses one pollutant or one specific health outcome; much less the total burden of cumulative physical health impacts of multiple environmental routes, including air, water, and soil exposure and work-related exposures. Also, systematic reviews do not often divide the information into regional and national contextual information, and the South Asian region and Bangladesh, in particular, are underrepresented. As a result, understanding vulnerabilities and making evidence-based policy geographically are hindered by this knowledge gap.

In an attempt to fill these gaps, the present systematic review aims to summarize the scientific literature published over the past 25 years (2000-2025) to articulate the burden of physical health diseases attributable to pollution on an international, regional (South Asia) and national (Bangladesh) scale. The synthesis of published literature will represent comprehensive estimation of physical health disease burden due to different types of environmental pollution, a clearer understanding of the explored themes and critical research gaps in different regions. The results are expected to inform the design of targeted, focused interventions in the fields of public health, evidence-based policymaking, and future research activities aimed at mitigating the health consequences of pollution in the most affected areas. Ultimately, it intends to stimulate global and regional action to reduce pollution and achieve improved health outcomes.

2. Methodology

The study has been carried out as a systematic review based on the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). Its purpose was to identify, assess and synthesize peer reviewed literature on the physical health effects of environmental pollution in the world, and more specifically in South Asia and Bangladesh.

2.1. Databases Searched & Study Selection

Search strings were developed using a combination of Boolean operators. Example keywords included:

("air pollution" OR "water pollution" OR "soil pollution" OR "noise pollution" OR "occupational exposure") AND ("health" OR "disease" OR "mortality' OR "burden") AND ("Bangladesh" OR "South Asia" OR "global" OR "world")

Databases searched included Google Scholar and PubMed. As vast collection of literature has been collected for this review, applying inclusion and exclusion criteria was must for study selection and quality assessment. Whole process is described in figure 1. Inclusion and exclusion of literature has been done through following the given information-

Table 1: Applied Inclusion and Exclusion Criteria

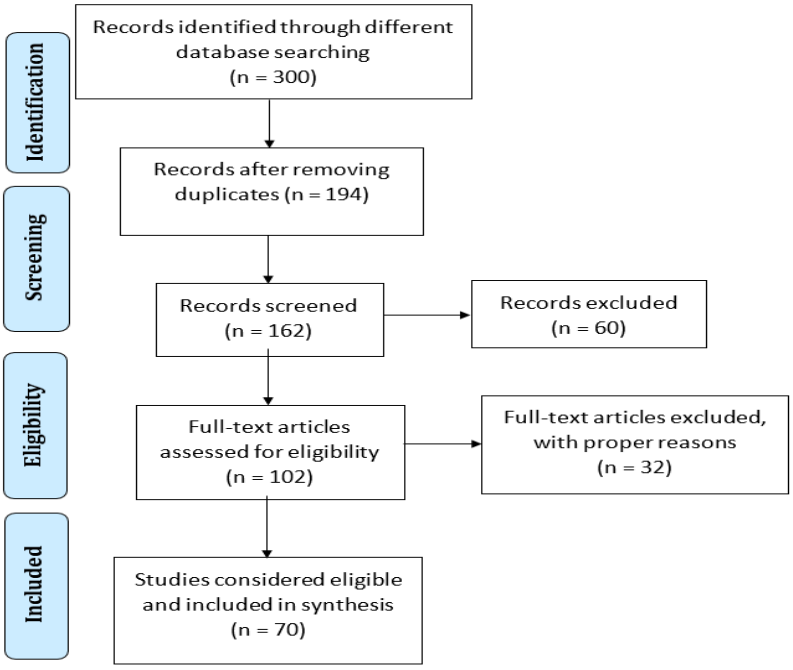
Component	Inclusion Criteria	Exclusion Criteria
Population	Human populations of all age groups globally, with specific focus on South Asia and Bangladesh	Studies involving animals or laboratory models
Exposure	Environmental pollution (Air, Water, Noise, Soil, Occupational hazards)	Studies without direct assessment of pollution exposure

Outcomes	Physical health effects including Respiratory diseases, CVDs, Cancers, Gastrointestinal disorders, Reproductive and developmental effects, Mortality	Studies focusing exclusively on mental health or psychological outcomes
Study Types	Peer-reviewed: – Observational (cohort, case-control, cross-sectional)– Systematic reviews and meta-analyses – Credible grey literature (e.g., institutional reports) published between January 2000–June 2025	Editorials, commentaries, conference abstracts without full text; non-English articles

2.2. Data Extraction and Synthesis

To extract data from collected literatures, a comprehensive literature matrix was created to capture all informative data like- study location, context, pollution type, impacts and disease name, methods of the study, key findings, limitations and finally author information and publication year. Collected information has been checked thoroughly and findings are presented based on global, regional and national scale. A comparative summary of findings has also been provided in discussion section.

Figure: Adapted PRISMA Framework



3. Result

3.1. Global Burden of Pollution Induced Physical Health Diseases

Research on the burden of physical health diseases globally due to environmental pollution (including air, water, soil, noise, and chemical exposures) has been increased significantly. There is an extensive body of reviews and findings related to global health studies (Manisalidis et al., 2020; Landrigan & Fuller, 2015; Kampa & Castanas, 2008) that link various environmental pollutants to a broad range of physical health outcomes. These outcomes include respiratory and cardiovascular disease, cancer, neurological impairments, or reproductive disorders. Out of them, the most thoroughly investigated and deeply linked to morbidity and mortality is air pollution, especially exposure to fine particulate matter (PM 2.5) and ozone (Manisalidis et al., 2020; Chen et al., 2024).

Table 2: Summarization of Pollution Induced Physical Health Diseases Globally

Reference	Pollution Type	Health Outcomes	Context	Study Design
Landrigan & Fuller (2015); Gyawali et al. (2023)	Air, water, soil	Respiratory diseases, CVDs, gastrointestinal diseases, cancer, mental illness	Low- and middle-income country burden	Review
Manisalidis et al. (2020); Kampa & Castanas (2008); Chen et al. (2024)	Air	Respiratory diseases, CVDs, neurological disorders, skin damage, systemic effects	Health impacts and disparities	Literature review / data analysis
Xu et al. (2022); Liu et al. (2022)	Air, heavy metals, endocrine-disrupting chemicals	Cancer, respiratory diseases, reproductive health issues, endocrine disorders, neurological disorders	Global review and health emergencies	Epidemiological and pathological review
Shetty et al. (2023); Fuller et al. (2022); Adigun & Odeleye (2025)	Air, water, soil, chemicals, noise	Cancer, CVDs, respiratory diseases, neurological disorders, non-communicable diseases, pollution-related mortality	Pollution burden and global trends	Review / thematic review

According to the Global Burden of Disease study, it is estimated that approximately 9 million premature deaths occur every year which are caused due to pollution with LMICs suffering the highest impact of it due to poor infrastructure, industrial pollutants, and lack of policies (Fuller et al., 2022). Chronic exposure disproportionately impacts vulnerable groups. Children and the elderly have been found to associate significantly with pollution leading to an unfavorable chronic disease prognosis as seen over time in China and other countries (Fan et al., 2021). New emerging issues are health impacts of heavy metals and endocrine disrupting chemicals (EDCs) that were linked with developmental and hormonal diseases (Xu et al., 2022). Sound pollution is also gaining its weight in CVDs and nervous disorders especially in overpopulated and urbanized environments (Anees et al., 2017).

3.2. Burden of Pollution Induced Physical Heath Diseases in South Asia

The situation in South Asia is characterized by a severe environmental health crisis with a heavy burden of disease caused by air, water and soil contamination. The most urgent danger is ambient and household air pollution. Research conducted in India, Nepal, Bangladesh, Pakistan, and Sri Lanka associates air pollution with an array of health problems such as asthma and COPD, as well as cardiovascular and neurodegenerative diseases and even diabetes (Abdul Jabbar et al., 2022; Yamamoto et al., 2014). Severe exposure to PM 2.5 and black carbon in urban settlements (like Karachi) is leading to higher rates of cardiopulmonary mortality in general and among children in particular (Sannoh et al., 2024).

Table 3: Overview of Pollution Induced Physical Health Diseases in South Asia

Reference	Region	Pollution Type	Health Outcomes	Context	Study Design
Abdul Jabbar et al. (2022); Yamamoto et al. (2014); Sannoh et al. (2024); Ho et al. (2014); Irfan (2024)	South Asia (incl. Pakistan, India, Bangladesh, Nepal)	Outdoor air pollution (PM2.5, PM10, black carbon, NO_2, haze)	CVDs, respiratory infections, asthma, cancer, diabetes, psychological stress, respiratory mortality	Air quality trends and health impacts	Data analysis, systematic review, health risk assessment, surveys
Rafiq et al. (2023); Sly et al. (2019)	South Asia & Southeast Asia	Indoor air pollution (biomass fuel, indoor smoke)	Respiratory diseases, cardiovascular risks, waterborne diseases	Women's and children's health impacts	Systematic review, review-based assessment

Noor et al. (2023)	Pakistan, India, Bangladesh, Nepal	Water pollution (arsenic, fluoride, pathogens)	Cancer, skeletal fluorosis, diarrheal diseases	Groundwater contamination and health risks	Field measurements, health risk assessment
Liu et al. (2024)	South & East Asia (India, Bangladesh, China)	Soil pollution (heavy metals: Cd, Pb, Cr)	Carcinogenesis, neurotoxicity, food chain contamination	Soil contamination disparities and remediation	Meta-analysis, remediation trials
Chen et al. (2023); Khaiwal et al. (2016)	South Asia (India, Nepal)	Noise pollution (traffic, industrial)	Hypertension, sleep disturbance, cardiovascular stress	Non-auditory health impacts in urban areas	Sound measurements, cross-sectional surveys
Jahan et al. (2023)	South Asia (India, Nepal, Bangladesh)	Occupational exposures (vehicular emissions, noise, UV)	Respiratory illness, hearing loss, musculoskeletal disorders	Health risks among traffic police	Systematic review
Suk et al. (2003)	Southeast & South Asia	Lead, endocrine-disrupting chemicals, persistent organic pollutants	Developmental issues, neurobehavioral disorders, reproductive disorders in children	Environmental threats to children's health	

The adverse exposure of indoor air pollution due to biomass burning in rural households is particularly a burden on women and children, continuing to worsen conditions of respiratory and cardiovascular problems (Rafiq et al., 2023). Pollutant rates have subsequently regained pre-COVID-19 levels even after temporary flattening when undergoing lockdowns, showing that there was a systematic breakdown in pollution control.

Persistent organic pollutant and heavy metal pollution are regional threats too. Research has cited prevalence of lead exposure and EDCs as the reason behind cognitive impairments, immune depression and growth disorders among children (Suk et al., 2003). Further regional threats, acute respiratory health effects and mental stress that can affect mental health, a poorly studied field, are seen in the case of the 2013 Haze incident in Singapore (Ho et al., 2014).

3.3. Burden of Pollution Induced Physical Heath Diseases in Bangladesh

One of the major environmental health hazards is air pollution in Bangladesh, especially, in its metropolitan areas such as Dhaka. Several articles (Rahman et al., 2025; Islam et al., 2024) state that there are strong correlations between PM 2.5 and PM 10 exposure and the rates of respiratory and CVDs. More risks are experienced by vulnerable groups such as children, the residents of the roadside, and marginalized communities (Khuda, 2020; Rahman et al., 2019). Still, research is narrowed by being reliant on self-reports and cross-sectional designs, and some studies lack clinical confirmation and longitudinal follow-ups (Siddiqui et al., 2020; Dibya et al., 2023).

Table 4: Overview of Air Pollution Induced Physical Health Diseases in Bangladesh

Reference	Health Outcomes	Context	Study Design
Khuda (2020)	Stroke, lung cancer, COPD, heart disease, lower respiratory tract infections (LRTIs), respiratory diseases, high mortality	Air pollution levels and urban roadside pollution health risks in Dhaka	Assessment / Review / Commentary
Khandker et al. (2023); Siddiqui et al. (2020); Islam et al.	COPD, lung cancer, ischemic heart disease, stroke, CVDs, respiratory diseases, cancer,	National and urban air pollution burden and health impacts	Review / Narrative review / Commentary

(2024)	mortality		
Rahman et al. (2019); Raza et al. (2023)	CVDs, lung cancer, COPD, stroke, LRTIs	Air pollution trends, synthesis of primary and global data	Cross-sectional / Mixed methods
Rahman et al. (2025)	Respiratory diseases, CVD, multiple self-reported health issues	Air pollution in urban marginalized areas	Cross-sectional survey
Dibya et al. (2023)	Asthma, COPD	Respiratory impacts of air pollution	Viewpoint / Review
Hossain et al. (2022)	Eye irritation, headaches, COPD, skin cancer, hypertension	Public and physician perceptions of air pollution	Perception survey

Surface and groundwater in Bangladesh face serious public health risks, especially due to heavy metal contamination, microbial pollution, and toxic nitrates. Other risk findings of carcinogenic nature were related to the presence of riverine heavy metals (Hasan et al., 2021) and children experiencing chronic illnesses related to nitrates (Muhib et al., 2023). There is consistent evidence of outbreaks of waterborne diseases in highly polluted regions of the river, like the Buriganga (Bilal et al., 2023; Pasha et al., 2023). However, a large part of the current evidence is regionally limited and cannot be directly related to clinical correlation which explains the necessity to conduct nationwide exposure-health correlation studies.

Table 5: Overview of Water Pollution Induced Physical Health Diseases in Bangladesh

Reference	Health Outcomes	Context	Study Design
Parvin & Tareq (2021); Hasan et al. (2021)	Anemia, brain damage, cancer, kidney issues, non-carcinogenic and carcinogenic risks (e.g., from cadmium)	Landfill leachate and heavy metal contamination in rivers	Risk assessment / Empirical field-lab study
Halder & Islam (2015); Pasha et al. (2023)	Skin disease, diarrhea, respiratory issues, yellow fever, increased waterborne diseases, poor hygiene	River pollution and community health	Empirical field / case study
Hasan et al. (2019); Bilal et al. (2023)	Cholera, typhoid, polio, cancer, kidney issues, waterborne diseases, cryptosporidiosis, heavy metal toxicity	National water pollution and public health	Review / Systematic review & meta-analysis
Uddin & Jeong (2021); Chakraborty et al. (2019)	Cancer, diarrhea, reproductive effects, cardiovascular disease, abdominal pain	Urban river pollution and saline water intrusion in coastal areas	Monitoring & risk assessment / Cross-sectional empirical
Brinkel et al. (2009)	Arsenicosis, mental health issues	Mental health impacts of arsenic exposure	Review
Muhib et al. (2023)	Chronic health risks, especially in children	Groundwater nitrate pollution risk	Systematic review & risk analysis

A less understood and increasingly important issue is the pollution of the soil, especially by heavy metals present in industry and mining regions. Self-reported respiratory and dermatological disorders corresponding to exposure to toxic soil were reported in the field studies of coal-rich lands (Habib et al., 2023; Islam et al., 2023). General analyses (Islam et al., 2018; Majumder et al., 2021) cite carcinogen- and system-hazards by food-chain contamination. Nonetheless, national scope in research and clinical outcome validation is missing, thus restricting policy applicability.

Table 6: Overview of Soil Pollution Induced Physical Health Diseases in Bangladesh

Reference	Health Outcomes	Context	Study Design

Jahan et al. (2024); Habib et al. (2023); Chakraborty et al. (2023); Kumar et al. (2022); Islam et al. (2018)	Cancer risk, carcinogenic and non-carcinogenic health risks from arsenic, cobalt, chromium, and other heavy metals	Soil contamination and health risks near coal mining, contaminated rice and groundwater	Empirical field studies, literature review, risk assessments
Muhib et al. (2023); Siddique et al. (2020)	Chronic disease risks, particularly in children, including non-carcinogenic risks	Risk analysis of nitrate pollution and child health risks from soil contamination	Systematic review, field studies, risk indices
Islam et al. (2023)	Respiratory problems, skin diseases, other health issues	Community health impacts in mining areas	Field surveys, self-reported data
Majumder et al. (2021)	Long-term adverse health effects from lead exposure	Lead exposure health review	Critical literature review

It is more commonly understood that urban noise can affect stress, sleep disturbance, and cardiovascular symptoms. According to cross-sectional surveys (Rahman et al., 2022; Quader et al., 2024), noise-induced health effects are extremely high in student and industrial groups. However, the research is modest in size, based on subjective evaluations, and it does not adequately represent rural and occupational exposures (Sarker et al., 2023).

Table 7: Overview of Noise Pollution Induced Physical Health Diseases in Bangladesh

Reference	Health Outcomes	Context	Study Design
Rahman et al. (2022); Quader et al. (2024); Islam et al. (2016); Islam et al. (2015); Alam et al. (2016)	Deafness, insomnia, headaches, hearing problems, heart disease, stress, fatigue, sleeplessness, bad temper	Noise pollution from traffic, industrial, hospital, roadside sources	Cross-sectional surveys, noise measurements, worker interviews, questionnaires
Sarker et al. (2023); Hossain & Shahriar (2024)	Auditory damage, nervous system damage, insomnia, cardiovascular and neurological disorders, sleep disruption, cardiovascular ailments	Noise pollution health review and traffic noise impacts	Literature review, noise measurement, statistical analysis

Bangladesh has prominent examples of industrial and informal-sector workers facing a number of occupational hazards. Empirical researches conducted among employees in the field of tannery, batteries, and garments show a high occurrence of respiratory, skin, and musculoskeletal diseases (Islam et al., 2024; Das et al., 2024). Issues of stress and physical strain, especially caused by work, are reported by female workers. Nevertheless, the majority of the research pieces have limited, local populations samples and rely on self-reporting, thus demanding longitudinal sectoral health monitoring.

Table 8: Overview of Occupational Pollution Induced Physical Health Diseases in Bangladesh

Reference	Health Outcomes	Context	Study Design
Sumit et al. (2020); Sultana et al. (2021); Jaman et al. (2024); Rabbani et al. (2021); Islam et al. (2014)	COPD, respiratory problems and symptoms, skin diseases, breathing difficulties, fever	Occupational health in industrial workers including garment sector and general workplaces	Cross-sectional hospital- and community-based surveys
Das et al. (2024); Yuan et al. (2022)	Insomnia, pain, memory loss, hypertension, occupational stress	Occupational health surveys, stress-related health risks, with higher risks reported in women	Cross-sectional empirical surveys
Halder et al. (2024)	Injuries, musculoskeletal disorders, skin diseases, respiratory	Occupational health in fisher communities	Mixed methods (qualitative and quantitative)

	issues		

The combined impact of multi-source pollution is reflected by integrated assessments. Case studies (Azom et al., 2012; Nahar et al., 2021) and reviews (Islam & Majumder, 2013; Hossain et al., 2015; Hasan et al., 2019) outline co-occurring exposures that lead to the development of coronary artery disease, arsenicosis, and other illnesses. These data imply additive, synergistic health risk, but exposure modeling of these multiple factors is poorly developed and exposure data are minimal at the national level.

4. Discussion

4.1. Main Pollution-Health Trends

This systematic review identifies physical health diseases caused by pollution as a recurrent and complicated universal health issue. Air pollution is the most researched and the most noteworthy, with PM 2.5, ozone, and heavy metals being attributed to a wide variety of health complications, including cardiovascular, respirator, neurological, and cancer-related health problems (Manisalidis et al., 2020; Fuller et al., 2022; Chen et al., 2024). After air pollution, greater researched is water pollution, in LMICs, where poor hardware and surveillance combination increase exposure and disease burden (Gyawali et al., 2023). Occupational exposures to health hazards, especially heavy metals, agrochemicals and industrial toxins, are linked to carcinogenesis and neurotoxicity with a substantial research gap (Xu et al., 2022). Another emerging issue concerns noise pollution, and it has been reported to cause cardiovascular and mental health disorders (Anees et al., 2017).

High poverty levels, urban crowding, and high levels of industrialization combine to pose environmental health challenges in the region of South Asia. Arguably common sources of pollution to which the populations are repeatedly exposed are ambient air pollution, indoor use of biomass fuels and exposure to toxic metals. Women, children, and low-income communities are the disproportionate group of exposures. However, much of the local evidence relies on cross-sectional or modeled data and few longitudinal or clinical researches except India and urban areas. Particularly, Bangladesh exemplifies these tendencies as extreme air and water pollution are evident in urban and industrial regions. Dhaka is affected by extremely dangerous PM2.5 pollutions, and rural locations involve groundwater pollution and new limitations of soil. But in Bangladesh, studies are largely urban centered and focused on only a few industries, and rural, noise, and multisource exposure studies are minimal. Cross-sectional designs also reduce the ability to interpret causally, being dominant.

4.2. Cross Regional Comparisons

Health effects caused by pollution reflect various contributing factors globally- air (e.g. PM 2, 5, NOx, ozone), water (heavy metals, harmful microorganisms, chemical), soil (industrial wastes, agrochemicals), occupational attacks. These sources are also shared by South Asia with the additional serious problem of indoor biomass burning and uncontrolled seasonal haze and industries. The case of pollution is similar in Bangladesh, where both regional and local stressor is reflected in high urban air pollution rates in Dhaka, high prevalence of arsenic and salinity in groundwater, and growing rates of soil degradation associated with rapid developments in industries.

At all levels, respiratory and CVDs are predominant. Millions of premature deaths were diseases connected to global pollution, and South Asia has a greater experience of developmental disorders and neurological disorders caused by pollutants such as lead and endocrine disruptors. Micro-level data in Bangladesh affirm that prevalence rates are high with asthma, COPD, cardiovascular complications, and pollution-related cancers. Environmental degradation and noise contribute to such problems as occupational diseases and mental health concerns, which are increasing but not well-represented in national studies.

Exposure distribution is not even across and within countries. Children, elderly, poor, and informal workers are considered vulnerable groups and have to be more exposed to it and are weaker when it comes to access to healthcare. In South Asia, the risks to health are enhanced by inequality and reliance on energy sources that are polluting along socio-economic lines. Poor people living in cities and rural people are exposed to the highest level of risk in Bangladesh due to poor infrastructure, a lack of regulation, and awareness.

4.3. Data and Methodological Limitations

The studies conducted globally usually work with extensive data sets, longitudinal observations, and combined multi-pollutant investigations. These techniques are much less prevalent in South Asia and hardly obtainable in Bangla-

desh. The majority of Bangladeshi studies are cross-sectional, which are based on short term or measuring at single sites, and deal with individual pollutants. Such a methodological weakness limits causal comparisons and negatively affects an evaluation of cumulative or long-term exposure effects.

Lack of longitudinal data in Bangladesh can be explained by a number of structural and resource-related limitations. To start with, research infrastructure (e.g. laboratories and monitoring stations) is skewed towards cities leaving rural data collection logistically difficult and expensive. Second, the funding of environmental health research is poorly developed, which decreases the possibility of the multi-year cohort studies. Third, there are no national coordinated surveillance systems that can allow the blending of environmental and the health data, reducing the scope of trend analyses. As a result, there is an underdeveloped evidence base on rural and multi-pollutants exposure.

4.4. Implications for Policy and Research

Global evidence base demonstrates the necessity of considering pollution mitigation strategies as part of health and sustainable development agendas, cross-border cooperation, and stronger politics. The focus in South Asia should be focused on reinforcing the legal enforcement of environmental regulations, targeting the range of interventions to the risk profiles present in the area, and broadening the data collection systems that can lead to timely and proper exposure measures. In the case of Bangladesh, it is necessary to expand environmental surveillance through rural and peri-urban areas, enhance institutional capability with regard to monitoring and enforcing pollution prevention, and augment awareness of the people to potential health hazards associated with pollution. Protecting vulnerable groups, especially those residing in urban flashpoints and in industry areas needs to create specific interventions in form of balancing regulatory enforcement and community support. There is a constant need to invest in long-term, multi-pollutant epidemiological studies, which provide policy relevant evidence strive to create. The development of multi-level, context-specific approaches, based on sound research, evidence-based policymaking, and community engagement is the most realistic way to curtail the burden of diseases due to pollution and to meet the health, environmental, and equity goals of SDGs.

5. Conclusion

This systematic review summarizes a strong base of international, regional and country specific evidence on the severe and complex health effects of environmental pollution. Pollution is a major source of morbidity and premature mortality, primarily via air, water, and ground exposures, occupational exposures and noise. The most intensively researched and still the greatest risk is air pollution. There is an ever-increasing role of heavy metals, endocrine-disrupting chemicals, and mixed exposures. Rural and urban South Asia and particularly Bangladesh are experiencing high pollution-related disease burdens because of explosive rates of urbanization, industrialization, weak infrastructure, and social disparity. Research is however very fragmented, predominantly cross-sectional or self-reported with few long term studies. In Bangladesh, pollution exposure is especially high in specific areas of cities and industries, and there are gaps in data on pollution in the rural areas, pollution at soil, occupational, and noise levels.

It is evident that longitudinal and multi-pollutant research is required more. Advanced analyzes such as geospatial mapping and bio monitoring should be applied in the future studies. It is also necessary to understand social and economic aspects of risk. Increase of research capacity, improving regional cooperation and coordination will enhance the quality and relevance of the evidence to policy. Stricter policies towards regulation and enforcement of pollution in industries, transport and waste management should be introduced. Development of clean infrastructure and technology is extremely important, particularly in industrial and urban regions. Public health interventions are expected to create awareness and offer focused screening to the susceptible groups. Further reduction in burden of disease may be achieved through inclusion of environmental health in planning of urban systems and safety at work.

Finally, to meet the goals of sustainable development such as SDG 3 (Good Health and Well-being), SDG 6 (Clean Water and Sanitation), and SDG 13 (Climate Action), it is necessary to combat the risks of pollution. As the climate changes are augmenting the risk of hazards, mitigating the pollution, and establishing health resilience are crucial to achieving sustainable development and ensuring the safety of vulnerable communities.

Declarations

Author Contributions

Nusrut Sharmin conceived the study, collected and analysed the data, prepared and finalized the manuscript independently.

Funding

No funding was received for this research.

Acknowledgement

No acknowledgements to declare.

Conflict of Interest

The author declares that there is no conflict of interest for the publication of this paper.

References

Abdul Jabbar, S., Tul Qadar, L., Ghafoor, S., Rasheed, L., Sarfraz, Z., Sarfraz, A., ... & Cherrez-Ojeda, I. (2022). Air quality, pollution and sustainability trends in South Asia: a population-based study. *International journal of environmental research and public health*, *19*(12), 7534. https://doi.org/10.3390/ijerph19127534.

Adigun, O. J., & Odeleye, D. A. (2025). The Devastating Consequences of Environmental Pollution on Human Health. *British Journal of Multidisciplinary and Advanced Studies*, *6*(1), 37-46. https://doi.org/10.37745/bjmas.2022.04230.

Alam, S., Akter, S. T., Sheikh, M. S., & Bahar, I. (2016). The Impact of noise pollution on workers health in selected industries of mirzapur industrial area, Tangail, Bangladesh. *Journal of Environmental Science and Natural Resources*, *9*(2), 155-160. https://doi.org/10.3329/jesnr.v9i2.32187.

Anees, M. M., Qasim, M., & Bashir, A. (2017). Physiological and physical impact of noise pollution on environment. *Earth Science Pakistan*, *1*(1), 08-11. https://doi.org/10.26480/esp.01.2017.08.10.

Azom, M. R., Mahmud, K., Yahya, S. M., Sontu, A., & Himon, S. B. (2012). Environmental impact assessment of tanneries: a case study of Hazaribag in Bangladesh. *International Journal of Environmental Science and Development*, *3*(2), 152. https://doi.org/10.7763/IJESD.2012.V3.206.

Babatola, S. S. (2018). Global burden of diseases attributable to air pollution. *Journal of public health in Africa*, *9*(3), 813. https://doi.org/10.4081/jphia.2018.813.

Bilal, H., Li, X., Iqbal, M. S., Mu, Y., Tulcan, R. X. S., & Ghufran, M. A. (2023). Surface water quality, public health, and ecological risks in Bangladesh—a systematic review and meta-analysis over the last two decades. *Environmental Science and Pollution Research*, *30*(40), 91710-91728. https://doi.org/10.1007/s11356-023-28879-x.

Brinkel, J., Khan, M. H., & Kraemer, A. (2009). A systematic review of arsenic exposure and its social and mental health effects with special reference to Bangladesh. *International journal of environmental research and public health*, *6*(5), 1609-1619. https://doi.org/10.3390/ijerph6051609.

Chakraborty, R., Khan, K. M., Dibaba, D. T., Khan, M. A., Ahmed, A., & Islam, M. Z. (2019). Health implications of drinking water salinity in coastal areas of Bangladesh. *International journal of environmental research and public health*, *16*(19), 3746. https://doi.org/10.3390/ijerph16193746.

Chakraborty, T. K., Islam, M. S., Ghosh, G. C., Ghosh, P., Zaman, S., Hossain, M. R., ... & Khan, A. S. (2023). Receptor model-based sources and risks appraisal of potentially toxic elements in the urban soils of Bangladesh. *Toxicology Reports*, *10*, 308-319. https://doi.org/10.1016/j.toxrep.2023.02.011.

Chen, F., Zhang, W., Mfarrej, M. F. B., Saleem, M. H., Khan, K. A., Ma, J., ... & Han, H. (2024). Breathing in danger: Understanding the multifaceted impact of air pollution on health impacts. *Ecotoxicology and Environmental Safety*, *280*, 116532. https://doi.org/10.1016/j.ecoenv.2024.116532.

Chen, Y., Hansell, A. L., Clark, S. N., & Cai, Y. S. (2023). Environmental noise and health in low-middle-income-countries: A systematic review of epidemiological evidence. *Environmental Pollution*, *316*, 120605. https://doi.org/10.1016/j.envpol.2022.120605.

Clark, S. N., Anenberg, S. C., & Brauer, M. (2024). Global Burden of Disease from Environmental Factors. *Annual Review of Public Health*, *46*. https://doi.org/10.1146/annurev-publhealth-071823-105338.

Cohen, A. J., Brauer, M., Burnett, R., Anderson, H. R., Frostad, J., Estep, K., ... & Forouzanfar, M. H. (2017). Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015. *The lancet*, *389*(10082), 1907-1918. https://doi.org/10.1016/S0140-6736(17)30505-6.

Das, S., Nath, T. C., Rahman, M., Uddin, J., Naher, N., Akter, M., ... & Adhikari, A. (2024). Occupational hazards in lead-acid battery factories in Bangladesh: Assessing excess heat, noise, chemical exposures, and health impacts on workers. *Safety and Health at Work*. https://doi.org/10.1016/j.shaw.2024.06.004.

Dibya, T. B., Proma, A. Y., & Dewan, S. M. R. (2023). Poor respiratory health is a consequence of Dhaka's polluted air: A Bangladeshi perspective. *Environmental Health Insights*, *17*, 11786302231206126. https://doi.org/10.1177/11786302231206126.

Fan, H., Wang, Y., Wang, Y., & Coyte, P. C. (2022). The impact of environmental pollution on the physical health of middle-aged and older adults in China. *Environmental Science and Pollution Research*, *29*(3), 4219-4231. https://doi.org/10.1007/s11356-021-15832-z.

Fuller, R., Landrigan, P. J., Balakrishnan, K., Bathan, G., Bose-O'Reilly, S., Brauer, M., ... & Yan, C. (2022). Pollution and health: a progress update. *The Lancet Planetary Health*, *6*(6), e535-e547. https://doi.org/10.1016/S2542-5196(22)00090-0.

Gyawali, K., Acharya, P., & Poudel, D. (2023). Environmental Pollution and its Effects on Human Health. *Interdisciplinary Research in Education*, *8*(1), 84-94. https://doi.org/10.3126/ire.v8i1.56729.

Habib, M. A., Islam, A. R. M. T., Varol, M., Phoungthong, K., Khan, R., Islam, M. S., ... & Pal, S. C. (2023). Receptor model-based source-specific health risks of toxic metal (loid) s in coal basin-induced agricultural soil in northwest Bangladesh. *Environmental Geochemistry and Health*, *45*(11), 8539-8564. https://doi.org/10.1007/s10653-023-01740-3.

Halder, C. E., Das, P. P., Rahman, S. T., Bhoumick, L. C., Tassdik, H., Hasan, M. A., & Mithun, S. N. (2024). Occupational hazards and risks among the women in fisher communities in Cox's Bazar and Chattogram, Bangladesh. *Plos one*, *19*(7), e0297400. https://doi.org/10.1371/journal.pone.0297400.

Halder, J. N., & Islam, M. N. (2015). Water pollution and its impact on the human health. *Journal of environment and human*, 2(1), 36-46. https://doi.org/10.15764/EH.2015.01005.

Hasan, M. F., Nur-E-Alam, M., Salam, M. A., Rahman, H., Paul, S. C., Rak, A. E., ... & Towfiqul Islam, A. R. M. (2021). Health risk and water quality assessment of surface water in an urban river of Bangladesh. *Sustainability*, *13*(12), 6832. https://doi.org/10.3390/su13126832.

Hasan, M. K., Shahriar, A., & Jim, K. U. (2019). Water pollution in Bangladesh and its impact on public health. *Heliyon*, *5*(8). https://doi.org/10.1016/j.heliyon.2019.e02145.

Hasnat, G. N., Kabir, M. A., & Hossain, M. A. (2019). Major environmental issues and problems of South Asia, particularly Bangladesh. In *Handbook of environmental materials management* (pp. 109-148). Springer, Cham. https://doi.org/10.1007/978-3-319-58538-3_7-1.

Ho, R. C., Zhang, M. W., Ho, C. S., Pan, F., Lu, Y., & Sharma, V. K. (2014). Impact of 2013 south Asian haze crisis: study of physical and psychological symptoms and perceived dangerousness of pollution level. *BMC psychiatry*, 14, 1-8. https://doi.org/10.1186/1471-244X-14-81.

Hossain, M. A., & Shahriar, R. (2024). *Traffic Induced Noise Pollution in Rajshahi City Corporation: A Study on Sources, Impacts and Solutions*. https://doi.org/10.11648/j.ajtte.20240904.12.

Hossain, M. L., Rahman, A. L., Ahmmad, N., Sheikh, M. A. A., Arzina, T. T., Shiraj, T. B., & Haque, M. M. (2022). Air Pollution in Dhaka City During Wintertime: Local vs. Transboundary Transport. *Journal of Science and Technology Research*, *4*(1), 81-90. https://doi.org/10.3329/jscitr.v4i1.67371.

Hossain, M. N., Paul, S. K., & Hasan, M. M. (2015). Environmental impacts of coal mine and thermal power plant to the surroundings of Barapukuria, Dinajpur, Bangladesh. *Environmental monitoring and assessment*, *187*, 1-11. https://doi.org/10.1007/s10661-015-4435-4.

Irfan, H. (2024). Air pollution and cardiovascular health in South Asia: A comprehensive review. *Current Problems in Cardiology*, *49*(2), 102199. https://doi.org/10.1016/j.cpcardiol.2023.102199.

Islam, A. M., & Majumder, A. A. S. (2013). Coronary artery disease in Bangladesh: A review. *Indian heart journal*, 65(4), 424-435. https://doi.org/10.1016/j.ihj.2013.06.004.

Islam, A. R. M. T., Jion, M. M. M. F., Jannat, J. N., Varol, M., Islam, M. A., Khan, R., ... & Habib, M. A. (2023). Perception and legacy of soil chromium and lead contamination in an operational small-scale coal mining community. *Environmental Geochemistry and Health*, *45*(10), 7237-7253. https://doi.org/10.1007/s10653-023-01571-2.

Islam, L. N., Sultana, R., & Ferdous, K. J. (2014). Occupational health of the garment workers in Bangladesh. *Journal of Environments*, *1*(1), 21-24. https://asianonlinejournals.com/index.php/JOEN/article/view/653/647.

Islam, M. A., Rahman, M. S., Roy, B., & Hossen, M. A. M. (2016). Noise pollution at health care centers in Mymensingh City of Bangladesh. *Journal of Environmental Science and Natural Resources*, *9*(1), 87-90. https://doi.org/10.3329/jesnr.v9i1.30297.

Islam, M. A., Romić, D., Akber, M. A., & Romić, M. (2018). Trace metals accumulation in soil irrigated with polluted water and assessment of human health risk from vegetable consumption in Bangladesh. *Environmental geochemistry and health*, *40*, 59-85 https://doi.org/10.1007/s10653-017-9907-8.

Islam, M. R., & Mostafa, M. G. (2020). Characterization of textile dyeing effluent and its treatment using polyaluminum chloride. *Applied Water Science*, *10*(5), 1-10. https://doi.org/10.1007/s13201-020-01204-4.

Islam, M. T., Nahar, N., Islam, M. J., Islam, M. A., & Hossen, M. A. M. (2015). Traffic induced noise pollution and its im-

pact on human health in Chittagong city corporation. *Journal of Environmental Science and Natural Resources*, *8*(2), 37-40. https://doi.org/10.3329/jesnr.v8i2.26862.

Islam, S., Tarik, I., Islam, M. K., Kabir, M. H., Sajib, S. M., & Bhadra, A. (2024). Air Pollution and Health Hazards: A Narrative Review from the Bangladesh Perspective. *Bangabandhu Sheikh Mujib Medical College Journal*, *3*(2), 101-106. https://doi.org/10.3329/bsmmcj.v3i2.75908.

Jahan, I., Dalal, K., Khan, M. A. S., Mutsuddi, A., Sultana, S., Rashid, M. U., ... & Hawlader, M. D. H. (2023). Occupational health hazards among traffic police in South Asian countries: protocol for a scoping review. *JMIR research protocols*, *12*(1), e42239. https://doi.org/10.2196/42239.

Jahan, I., Reza, A. S., Haque, M. M., Reza, M. S., & Hasan, M. I. (2024). Soil pollution and elemental sources along Barapukuria coal mine, Bangladesh: Implications for eco-environmental and health risk assessment. *Heliyon*, *10*(12). https://doi.org/10.1016/j.heliyon.2024.e32620.

Jaman, F., Sultana, F., Sharmin, I., Koley, N. J., & Paul, A. (2024). Occupational Health Risks in Savar's BSCIC Zone: The Dark Side of Tannery Industry. *Chittagong University Journal of Biological Sciences*, 115-129. https://doi.org/10.3329/cujbs.v12i1.78249.

Kampa, M., & Castanas, E. (2008). Human health effects of air pollution. *Environmental pollution*, *151*(2), 362-367. https://doi.org/10.1016/j.envpol.2007.06.012.

Khaiwal, R., Singh, T., Tripathy, J. P., Mor, S., Munjal, S., Patro, B., & Panda, N. (2016). Assessment of noise pollution in and around a sensitive zone in North India and its non-auditory impacts. *Science of the Total Environment*, *566*, 981-987. https://doi.org/10.1016/j.scitotenv.2016.05.070.

Khandker, S., Mohiuddin, A. S. M., Ahmad, S. A., McGushin, A., & Abelsohn, A. (2023). Air pollution in bangladesh and its consequences. https://doi.org/10.21203/rs.3.rs-1184779/v2.

Khuda, K. E. (2020). Air pollution in the capital city of Bangladesh: its causes and impacts on human health. *Pollution*, 6(4), 737-750. https://doi.org/10.22059/poll.2020.300588.775.

Kumar, S., Rahman, M. A., Islam, M. R., Hashem, M. A., & Rahman, M. M. (2022). Lead and other elements-based pollution in soil, crops and water near a lead-acid battery recycling factory in Bangladesh. *Chemosphere*, *290*, 133288. https://doi.org/10.1016/j.chemosphere.2021.133288.

Landrigan, P. J., & Fuller, R. (2015). Global health and environmental pollution. *International journal of public health*, *60*, 761-762. https://doi.org/10.1007/s00038-015-0706-7.

Landrigan, P. J., Fuller, R., Acosta, N. J., Adeyi, O., Arnold, R., Baldé, A. B., ... & Zhong, M. (2018). The Lancet Commission on pollution and health. *The lancet*, *391*(10119), 462-512. https://doi.org/10.1016/S0140-6736(17)32345-0.

Liu, L., Wang, J., Zhai, J., Yan, D., & Lin, Z. (2024). Regional disparities and technological approaches in heavy metal remediation: A comprehensive analysis of soil contamination in Asia. *Chemosphere*, 143485. https://doi.org/10.1016/j.chemosphere.2024.143485.

Majumder, A. K., Al Nayeem, A., Islam, M., Akter, M. M., & Carter, W. S. (2021). Critical review of lead pollution in Bangladesh. *Journal of Health and Pollution*, *11*(31), 210902. https://doi.org/10.5696/2156-9614-11.31.210902.

Manisalidis, I., Stavropoulou, E., Stavropoulos, A., & Bezirtzoglou, E. (2020). Environmental and health impacts of air pollution: a review. *Frontiers in public health*, *8*, 14. https://doi.org/10.3389/fpubh.2020.00014.

Moradi, M., Behnoush, A. H., Abbasi-Kangevari, M., Saeedi Moghaddam, S., Soleimani, Z., Esfahani, Z., ... & Farzadfar, F. (2023). Particulate matter pollution remains a threat for cardiovascular health: findings from the global burden of disease 2019. *Journal of the American Heart Association*, *12*(16), e029375. https://doi.org/10.1161/JAHA.123.029375.

Muhib, M. I., Ali, M. M., Tareq, S. M., & Rahman, M. M. (2023). Nitrate pollution in the groundwater of Bangladesh: An emerging threat. *Sustainability*, *15*(10), 8188. https://doi.org/10.3390/su15108188.

Nahar, N., Mahiuddin, S., & Hossain, Z. (2021). The severity of environmental pollution in the developing countries and its remedial measures. *Earth*, *2*(1), 124-139. https://doi.org/10.3390/earth2010008.

Noor, R., Maqsood, A., Baig, A., Pande, C. B., Zahra, S. M., Saad, A., ... & Singh, S. K. (2023). A comprehensive review on water pollution, South Asia Region: Pakistan. *Urban Climate*, *48*, 101413. https://doi.org/10.1016/j.uclim.2023.101413.

Parvin, F., & Tareq, S. M. (2021). Impact of landfill leachate contamination on surface and groundwater of Bangladesh: a systematic review and possible public health risks assessment. *Applied water science*, *11*(6), 100. https://doi.org/10.1007/s13201-021-01431-3.

Pasha, A. B. M. K., Nur, M. S., Mozumder, S., & Parveen, M. (2023). Impact of River Water Quality on Public Health in Perspective of Asian Rivers: A Case Study of Buriganga River. *Bangladesh. J. Environ. Earth Sci*, *5*, 1-16. https://doi.org/10.30564/jees.v5i1.5132.

Prüss-Üstün, A., Wolf, J., Corvalán, C., Bos, R., & Neira, M. (2016). *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*. World Health Organization.

https://www.who.int/publications/i/item/9789241565196.

Quader, M. A., Rahman, M. M., Chisty, M. A., Saeed Al Hattawi, K., Alam, E., & Islam, M. K. (2024). Evaluation of noise pollution impact on health in Dhaka city, Bangladesh. *Frontiers in Public Health*, *12*, 1477684. https://doi.org/10.3389/fpubh.2024.1477684.

Rabbani, G., Billah, B., Giri, A., Hossain, S. M., Mahmud, A. I. I., Banu, B., ... & Alif, S. M. (2021). Factors associated with health complaints among leather tannery workers in Bangladesh. *Workplace Health & Safety*, *69*(1), 22-31. https://doi.org/10.1177/2165079920936222.

Raessler, M. (2018). The arsenic contamination of drinking and groundwaters in Bangladesh: featuring biogeochemical aspects and implications on public health. *Archives of environmental contamination and toxicology*, *75*(1), 1-7. https://doi.org/10.1007/s00244-018-0511-4.

Rafiq, L., Naqvi, S. H. Z., Shahzad, L., & Ali, S. M. (2023). Exploring the links between indoor air pollutants and health outcomes in South Asian countries: a systematic review. *Reviews on environmental health*, *38*(4), 741-752. https://doi.org/10.1515/reveh-2022-0154.

Rahman, M. M., Ali, M. A., Khatun, R., & Tama, R. A. Z. (2016). Effect of noise pollution on patients in hospitals and health clinics of Mymensingh sadar upazila. *International Journal of Innovation and Applied Studies*, *18*(1), 97. https://ijias.issr-journals.org/abstract.php?article=IJIAS-16-152-01.

Rahman, M. M., Hasanuzzaman, A. B. M., Chisty, M. A., Alam, E., Islam, M. K., & Islam, A. R. M. T. (2025). Perceived-air pollution and self-reported health status: a study on air pollution-prone urban area of Bangladesh. *Frontiers in Public Health*, *13*, 1382471. https://doi.org/10.3389/fpubh.2025.1382471.

Rahman, M. M., Mahamud, S., & Thurston, G. D. (2019). Recent spatial gradients and time trends in Dhaka, Bangladesh, air pollution and their human health implications. *Journal of the Air & Waste Management Association*, *69*(4), 478-501 .https://doi.org/10.1080/10962247.2018.1548388.

Rahman, M. M., Tasnim, F., Quader, M. A., Bhuiyan, M. N. U. I., Sakib, M. S., Tabassum, R., ... & Islam, A. R. M. T. (2022). Perceived noise pollution and self-reported health status among adult population of Bangladesh. *International journal of environmental research and public health*, *19*(4), 2394. https://doi.org/10.3390/ijerph19042394.

Raza, W. A., Mahmud, I., & Rabie, T. S. (2022). *Breathing heavy: New evidence on air pollution and health in Bangladesh*. World Bank Publications. https://doi.org/10.1596/978-1-4648-1919-3.

Ruan, Y., Bao, Q., Wang, L., Wang, Z., Zhu, W., & Wang, J. A. (2024). Cardiovascular diseases burden attributable to ambient PM2. 5 pollution from 1990 to 2019: A systematic analysis for the global burden of disease study 2019. *Environmental research*, *241*, 117678. https://doi.org/10.1016/j.envres.2023.117678.

Sannoh, F., Fatmi, Z., Carpenter, D. O., Santoso, M., Siddique, A., Khan, K., ... & Khwaja, H. A. (2024). Air pollution we breathe: Assessing the air quality and human health impact in a megacity of Southeast Asia. *Science of The Total Environment*, 942, 173403. https://doi.org/10.1016/j.scitotenv.2024.173403.

Sarker, P. C., Siddique, M. N. E. A., & Sultana, S. (2023). A review of environmental noise pollution and Impacts on Human Health in Rajshahi City, Bangladesh. *Indonesian Journal of Environmental Management and Sustainability*, *7*(3), 80-87. https://doi.org/10.26554/ijems.2023.7.3.80-87.

Shetty, S. S., Deepthi, D., Harshitha, S., Sonkusare, S., Naik, P. B., & Madhyastha, H. (2023). Environmental pollutants and their effects on human health. *Heliyon*, *9*(9). https://doi.org/10.1016/j.heliyon.2023.e19496.

Siddique, M. A. B., Alam, M. K., Islam, S., Diganta, M. T. M., Akbor, M. A., Bithi, U. H., ... & Ullah, A. A. (2020). Apportionment of some chemical elements in soils around the coal mining area in northern Bangladesh and associated health risk assessment. *Environmental Nanotechnology, Monitoring & Management*, *14*, 100366. https://doi.org/10.1016/j.enmm.2020.100366.

Siddiqui, S. A., Jakaria, M., Amin, M. N., Al Mahmud, A., & Gozal, D. (2020). Chronic air pollution and health burden in Dhaka city. *European Respiratory Journal*, *56*(2). https://doi.org/10.1183/13993003.00689-2020.

Sly, P. D., Trottier, B., Carpenter, D., Cha'on, U., Cormier, S., Galluzzo, B., ... & Suk, W. A. (2019). Children's environmental health in South and Southeast Asia: Networking for better child health outcomes. *Annals of global health*, 85(1), 17. https://doi.org/10.5334/aogh.2403.

Suk, W. A., Ruchirawat, K. M., Balakrishnan, K., Berger, M., Carpenter, D., Damstra, T., ... & Zheng, B. S. (2003). Environmental threats to children's health in Southeast Asia and the Western Pacific. *Environmental health perspectives*, *111*(10), 1340-1347. https://doi.org/10.1289/ehp.6059.

Sultana, F., Rayhan, S. I., Hossain, S. M. I., Sarkar, T., Ahmade, R., Mogal, M. R., & Sikder, M. A. (2021). Effects of Occupational Hazards on Pulmonary Health among Lathe Machine Workers: A Cross-Sectional Study in Tangail, Bangladesh. *International Journal of Innovative Research in Medical Science (IJIRMS)*, *6*(11). https://doi.org/10.23958/ijirms/vol06-i11/1251.

Sumit, A. F., Das, A., Miraj, I. H., & Bhowmick, D. (2020). Association between chronic obstructive pulmonary disease (COPD) and occupational exposures: A hospital based quantitative cross-sectional study among the Bangladeshi population. *Plos one*, *15*(9), e0239602. https://doi.org/10.1371/journal.pone.0239602.

Uddin, M. J., & Jeong, Y. K. (2021). Urban river pollution in Bangladesh during last 40 years: potential public health and ecological risk, present policy, and future prospects toward smart water management. *Heliyon*, *7*(2). https://doi.org/10.1016/j.heliyon.2021.e06107.

Xu, H., Jia, Y., Sun, Z., Su, J., Liu, Q. S., Zhou, Q., & Jiang, G. (2022). Environmental pollution, a hidden culprit for health issues. *Eco-Environment & Health*, *1*(1), 31-45. https://doi.org/10.1016/j.eehl.2022.04.003.

Yamamoto, S. S., Phalkey, R., & Malik, A. A. (2014). A systematic review of air pollution as a risk factor for cardiovascular disease in South Asia: Limited evidence from India and Pakistan. *International journal of hygiene and environmental health*, 217(2-3), 133-144. https://doi.org/10.1016/j.ijheh.2013.08.003.

Yuan, D., Gazi, M. A. I., Rahman, M. A., Dhar, B. K., & Rahaman, M. A. (2022). Occupational stress and health risk of employees working in the garments sector of Bangladesh: An empirical study. *Frontiers in public health*, *10*, 938248. https://doi.org/10.3389/fpubh.2022.938248.